Worksheet 4 Stacks Answers

Task 1 Crushing cars

1. (a) Complete the following to show the operations implemented on a collection of burnt-out cars. The stack can hold a maximum of 6 items.

Cars: Mondeo, Golf, Fiesta, Punto, Civic, Porsche

Representations of the stack drawn both horizontally and vertically are shown. Show the state of the stack after each operation in both representations, and in the first table, show any results returned.

Stack		Result returned
carStack = Stack()	[]	
carStack.push (Mondeo)	[Mondeo]	
carStack.push (Golf)	[Mondeo, Golf]	
carStack.isEmpty()		False
carStack.push(Fiesta)	[Mondeo, Golf, Fiesta]	
carStack.push(Punto)	[Mondeo, Golf, Fiesta, Punto]	
carStack.pop()	[Mondeo, Golf, Fiesta]	Punto
carStack.push(Civic)	[Mondeo, Golf, Fiesta, Civic]	
carStack.push(Porsche)	[Mondeo, Golf, Fiesta, Civic, Porsche]	
carStack.isFull()		False
carStack.pop()	[Mondeo, Golf, Fiesta,Civic]	Porsche
carStack.pop()	[Mondeo, Golf, Fiesta]	Civic

				Punto
			Fiesta	Fiesta
		Golf	Golf	Golf
	Mondeo	Mondeo	Mondeo	Mondeo

		Porsche		
	Civic	Civic	Civic	
Fiesta	Fiesta	Fiesta	Fiesta	Fiesta
Golf	Golf	Golf	Golf	Golf
Mondeo	Mondeo	Mondeo	Mondeo	Mondeo

2. Complete the pseudocode below for a program which uses a stack to test an input string to determine whether it is a palindrome (the same backwards and forwards, like “peep”)

   Assume that a class **Stack** implements the operations in the table in question 1.

```
myString = input (“Please enter a word or phrase to be tested: ”)
list1 = list(myString)    //convert myString to a list of characters
numChars = len(list1)
s = Stack()
//push each character onto the stack
for char in list1
  s.push(char)
next char

list2 = []   #create an empty list
#pop each character off the stack into a second list
for char = 0 to numChars - 1
  list2.append(s.pop())
next char

#compare the two lists, one is the reverse of the other
if list1 == list2 then
    print("This is a palindrome")
else
    print("This is not a palindrome")
endif
```

(See Python/VB programs palindrome.py in folder program folders)